

What Is Claimed Is:

1. A glazing panel system providing light transmission therethrough comprising:
  - a first glazing panel of plastic;
  - 5 an upstanding seam flange on an end of the glazing panel and being joined at its lower end to the first glazing panel;
  - a first end on the first glazing panel;
  - a second glazing panel of plastic;
  - 10 a first end on the second glazing panel;
  - an upstanding seam flange joined at its lower end to the first end of the second glazing panel;
  - a retention clip being disposed between adjacent first ends of the first and second glazing
  - 15 panels and being adjacent their respective upstanding seam flanges;
  - an internal connector connected to the glazing panels to assist retention of the glazing panels against separation under high negative loads; and
  - 20 a second covering connector covering the internal connector and the upstanding seams and connected to the glazing panels.
2. A glazing panel system in accordance with Claim 1 wherein the internal and external connectors are  
25 inverted U-channels in shape.
3. A glazing panel system in accordance with Claim 2 wherein the glazing panels having first and second spaced tooth surfaces thereon; and  
the internal and external connectors have  
30 toothed surfaces thereon for engagement with the tooth surfaces on the glazing panels.

4. A glazing panel system in accordance with Claim 3 wherein the internal and external connectors are flexible to expand over the tooth surfaces and then to contract to interlock with the toothed surfaces on the  
5 glazing panels.

5. A glazing panel system in accordance with Claim 1 wherein the toothed surfaces are spaced from one another in a horizontal direction.

6. A glazing panel system in accordance with  
10 Claim 1 wherein the internal connector is less flexible than the flexible external connector with respect to retaining the glazing panels together under high negative loads applied to the glazing panels.

7. A glazing panel in accordance with Claim 1  
15 wherein the external connector has a tighter engagement with the glazing panels to provide waterproof seams covering between adjacent panels than a looser engagement by the internal connector with the upstanding seam flanges.

20 8. A glazing panel in accordance with Claim 7 wherein the internal connector has a predetermined tolerance with respect to the upstanding seam to allow expansion of the seam flange at higher temperatures.

9. A glazing panel system in accordance with  
25 Claim 7 wherein the external connector is more flexible than internal connectors to allow expansion of the seam flanges with flexing of the connector.

10. A glazing panel system in accordance with Claim 1 wherein the retention clip engages the seam flanges at a position below the top ends of the upstanding seam flanges.

5 11. A glazing panel system in accordance with Claim 10 wherein each of the glazing panel has a pair of spaced upstanding seam portions; and

the internal connector is an inverted channel having depending legs positioned between the respective  
10 upstanding seam portions.

12. A glazing panel system in accordance with Claim 1 wherein the retention clip engages the upstanding seam flanges at a position located below a top end on the upstanding seam flanges to provide an improved retention  
15 of adjacent glazing panels against separation.

13. A glazing panel system in accordance with Claim 1 wherein a clip retention pocket is formed in the glazing panel to receive a portion of the retention clip therein.

20 14. A glazing panel system providing light transmission therethrough comprising:

a first glazing panel of plastic;  
an upstanding seam flange on an end of the glazing panel and being joined at its lower end to the  
25 first glazing panel;  
a first end on the first glazing panel;  
a second glazing panel of plastic;  
a first end on the second glazing panel;  
an upstanding seam flange joined at its lower  
30 end to the first end of the second glazing panel;

a retention clip being disposed between adjacent first ends of the first and second glazing panels and being adjacent their respective upstanding seam flanges;

5 a base on the retention clip for being secured to a support member for the glazing panels;

a web portion on the clip extending upwardly from the clip base and extending between the adjacent first ends of the first and second glazing panels;

10 a seam covering member covering a seam between adjacent seam flanges; and

a portion on the retention clip extending transversely from the clip web and spaced upwardly of the clip base and engaging the first and second glazing panels adjacent the lower ends of the upstanding seam flanges for resisting uplift loads.

15 15. A glazing panel system in accordance with Claim 14 comprising:

an internal connector connected to the seam flanges and covered by the seam covering member.

20 16. A glazing panel system in accordance with Claim 14 wherein the clip web portion has a height which substantially matches the height of the first ends of the first and second panels between upper and lower surfaces thereof.

25 17. A glazing panel system in accordance with Claim 16 wherein an empty space is provided between the upper portions of the upstanding seam flanges above the upper portion of the retention clip for expansion of the adjacent glazing panels as their temperature rises.

18. A glazing panel system in accordance with Claim 14 comprising:

upstanding, projecting portions on the first ends of the glazing panels between the upstanding seam  
5 flanges; and

depending portions on the transversely extending portion of the retention clip depending to cooperate with the upstanding projecting portions to resist separation of the respective first end glazing  
10 panels.

19. A glazing panel system in accordance with Claim 18 wherein the depending portions on the upper portion of the retention clip comprise a parallel pair of depending flanges.

15 20. A glazing panel system in accordance with Claim 19 wherein the parallel, depending flanges are inserted into parallel pockets located in the ends of the respective first and second panels at a location adjacent the lower ends of the upstanding seam flanges.

20 21. A glazing panel system in accordance with Claim 18 wherein the upstanding projections on the first and second glazing panels comprise a pair of parallel bars disposed between the upstanding seam flanges; and  
the clip depending portions comprising parallel  
25 flanges disposed on opposite sides of the upstanding bars.

22. A glazing panel assembly in accordance with Claim 14 wherein the transversely extending portions of the retention clip extends substantially transversely  
30 into openings provided in the central portions of the end

walls of the adjacent first and second glazing panels at locations beneath the upstanding seam flanges.

23. A glazing panel system in accordance with Claim 22 wherein the transversely extending portions of the retention clip have enlarged cross-sections on the outer end portions thereof disposed in similarly shaped openings in the adjacent ends of the respective first and second glazing panels.

24. A glazing panel system in accordance with Claim 23 wherein the upper portion of the clip terminates at a height which is less than the distance between top and bottom sides of the respective first and second glazing panels.

25. A panel system in accordance with Claim 22 comprising a retention clip having a web extending upwardly between the seam flanges and having a top flange portion extending over the top ends of the respective seam flanges.

26. A glazing panel system in accordance with Claim 22 wherein multiply transversely extending portions are provided on the retention clip to restrain the glazing panels at vertically spaced locations at their respective ends.

27. A glazing panel system in accordance with Claim 14 wherein the upper portion of the retention clip has a movable connection to the web portion which allows the upper portion to shift relative to the web portion with expansion and contraction of the respective glazing panels.

28. A glazing panel system in accordance with Claim 27 wherein the movable connection comprises:

a slider and a slot with the slider mounted in the slot on the retention clip to allow shifting of the upper portion relative to the web.

29. A glazing panel system in accordance with Claim 14 wherein the retention clip is made of extruded metal.

30. A glazing panel system in accordance with Claim 14 wherein the retention clip is formed of a bent piece of sheet metal.

31. A retention clip for architectural panels having upstanding seam flanges adjacent one another and a seam between the adjacent panels, the retention clip comprising:

an upstanding central web for being positioned at the seam;

a base integral with a lower end of the central web and for connection to a support for the panels; and

a movable top flange interconnected with and movable relative to the web and extending transversely to the web to engage the respective panels to hold the same against uplifting forces trying to separate the panels from one another.

32. A retention clip in accordance with Claim 31 wherein the moveable top flange has a slidable connection with the central web to allow movement of the top flange relative to the central web with expansion and contraction of the glazing panels.

33. A retention clip in accordance with Claim 32 wherein the slidable connection comprises an elongated slot and a slidable portion comprises the top flange slidable within the slot.

5           34. A retention clip for architectural panels having upstanding seam flanges adjacent one another and a seam between the adjacent panels, the retention clip comprising:

10           an upstanding central web for being positioned at the seam;

            a base integral with a lower end of the central web and for connection to a support for the panels; and

            a transverse flange mounted on the web and extending transversely to the web to engage the  
15   respective panels to hold the same against uplifting forces trying to separate the panels from one another; and

            the transverse flange having inner portions of a first cross-sectional thickness and having end portions  
20   of a greater cross-sectional thickness.

35. A retention clip in accordance with Claim 34 wherein the outer portions have a generally circular cross-section for being disposed within similar shaped openings in the ends of the respective  
25   panels.

36. A retention clip in accordance with Claim 34 wherein the transverse flange is positioned closely adjacent to the base with a web which is less in height than the height of the ends of the respective  
30   glazing panels.



37. A retention clip in accordance with  
Claim 34 wherein a top flange portion is positioned on  
the central web at a location above the transverse flange  
for being seated over the tops of the upstanding seam  
5 flanges.

38. A retention clip for architectural panels  
having upstanding seam flanges adjacent one another and a  
seam between the adjacent panels, the retention clip  
comprising:

10 an upstanding central web for being positioned  
at the seam;

a base integral with a lower end of the central  
web and for connection to a support for the panels;

15 a top flange mounted on and upper portion of  
the web; and

depending portions on the top flange extending  
downwardly from the top flange to engage the respective  
panels to hold the same against forces trying to separate  
the panels from one another.

20 39. A retention clip in accordance with  
Claim 38 wherein the depending portions comprise a pair  
of depending flanges which define a channel with the  
central web for receiving therein a respective upwardly  
projecting portion on a panel end.

25 40. A retention clip in accordance with  
Claim 38 wherein the central web has a height  
substantially equal to the height of ends of the glazing  
panels.

30 41. A retention clip in accordance with  
Claim 38 wherein the central web is substantially greater

in height than that of the cross-sectional thickness of the glazing panel and is positioned to have the top flange positioned between the upstanding seam flanges.

42. A retention clip in accordance with  
5 Claim 38 wherein the retention clip is made of an extruded metal.

43. A retention clip in accordance with  
Claim 38 wherein the retention clip was formed of bent sheet metal.

10 44. An extruded, modular, light transmitting plastic architectural panel comprising:  
two outer major surfaces located on opposite sides of the architectural panel;  
a first end on the panel;  
15 a joining seam flange projecting outwardly at an angle and having a lower end thereon which is integrally joined to the first panel end for being interconnected with another joining seam flange of another extruded plastic panel;  
20 clip engaging portions on the panel for engaging a retention clip to hold the panel against separation from another panel;  
a first interlock on the upstanding seam for interlocking with a first internal connector; and  
25 a second interlock on the upstanding seam for interlocking with an external connector.

45. An architectural glazing panel in accordance with Claim 44 wherein the first and second interlocks comprise:

stepped surfaces on the upstanding seam positioned at spaced locations to interlock with stepped surfaces on the first and second connector.

46. A glazing panel and retention clip in  
5 accordance with Claim 45 in which the stepped surfaces are positioned at horizontal spaced locations relative to an adjacent end of the glazing panel.

47. An architectural glazing panel in  
accordance with Claim 44 wherein the first interlock is  
10 spaced vertically relative to the second interlock and relative to one of the major surfaces of the panel.

48. An architectural panel in accordance with  
Claim 44 wherein the clip engaging portions includes a  
clip receiving pocket for receiving a portion of an upper  
15 flange of a retention clip.

49. An extruded, modular, light transmitting  
plastic architectural panel comprising:  
two outer major surfaces on located on opposite  
sides of the architectural panel separated by a space  
20 from one another;

a reinforcing structure having spaced members  
dividing the space between the outer major surfaces into  
sub-spaces;

a first end on the panel;  
25 a joining seam flange projecting outwardly at an angle and having a lower end thereon which is integrally joined to the first panel end for being interconnected with another joining seam flange of another extruded plastic panel; and

a clip receiver formed at the end of the panel adjacent the lower end of the joining seam flange for receiving in the clip receiver a transversely extending portion of a retention clip to apply a resisting force  
5 against uplift loads directly to the panel end.

50. An architectural glazing panel in accordance with Claim 49 wherein the clip receiver comprises:

a pocket formed in the first end of the glazing  
10 panel adjacent the lower ends of the upstanding seam flange for receiving therein the transversely extending portion of the retention clip.

51. A glazing panel and retention clip in accordance with Claim 50 wherein a lower portion of the  
15 upstanding seam flange is positioned to overly and to engage the upper portion of the retention clip to resist uplift loads.

52. An architectural glazing panel in accordance with Claim 49 wherein the distance between the  
20 two major surfaces substantially matches the height of an upstanding web portion on the clip.

53. An architectural panel in accordance with Claim 49 wherein the clip receiving pocket comprises a channel adjacent the lower end of the seam flange for  
25 receiving a transversely extending retention clip.

54. An extruded plastic architectural panel in accordance with Claim 49 comprising:

a pocket extending laterally into the panel first end between the two outer major surfaces for

receiving a transversely extending portion of the retention clip between the major surfaces.

55. An architectural panel in accordance with Claim 54 wherein the pocket comprises a narrow channel  
5 extending laterally from the panel first end and comprises an enlarged chamber larger in cross-sectional dimension than the dimension of the narrow channel to receive an enlarged portion of the retention clip therein.

10 56. An architectural panel in accordance with Claim 49 wherein the seam flange is spaced laterally inward relative to the first end of the panel.

57. An architectural panel in accordance with Claim 49 comprising:  
15 an upstanding projection on the panel first end adjacent the upstanding seam flange for cooperation with the retention clip adjacent the lower end of the upstanding seam flange.

58. An architectural panel in accordance with  
20 Claim 57 wherein the upstanding projection comprises a longitudinally extending bar which projects upwardly above an outer major surface of the panel and defines a slot between the bar and an upstanding seam flange.

59. A glazing panel system providing light  
25 transmission therethrough comprising:  
a first glazing panel of plastic;  
an upstanding seam flange on an end of the glazing panel and being joined at its lower end to the first glazing panel;

a first end on the first glazing panel;  
a second glazing panel of plastic;  
a first end on the second glazing panel;  
an upstanding seam flange joined at its lower  
5 end to the first end of the second glazing panel;  
a retention clip being disposed between  
adjacent first ends of the first and second glazing  
panels and being adjacent their respective upstanding  
seam flanges;  
10 a base on the retention clip for being secured  
to a support member for the glazing panels;  
a web portion on the clip extending upwardly  
from the clip base and extending between the adjacent  
first ends of the first and second glazing panels;  
15 a top flange on the clip engaging upper ends of  
the respective upstanding seam flanges;  
a metal reinforcing member having a channel  
therein disposed over the top flange of the clip and over  
the upper ends of the seam flanges to assist in  
20 preventing separation of the seam flanges under uplift  
loads; and  
engageable portions on the seam flanges and the  
metal reinforcing member to retain the reinforcing member  
superimposed over the slip upper flange and the tops of  
25 the upstanding seam flanges.

60. A retention clip for architectural panels  
having upstanding seam flanges adjacent one another and a  
seam between the adjacent panels, the retention clip  
comprising:  
30 a metal clip body;  
an upstanding central web on the extruded clip  
body for being positioned at the seam;

a base integral with a lower end of the central web and for connection to a support for the panels;

a metal top flange formed separately from the extruded clip body;

5 the top flange extending transversely to the web to engage the respective panels to hold the same against uplifting forces trying to separate the panels from one another; and

10 interlocking portions on the clip body and on the metal top flange joining the same together.

61. A retention clip in accordance with Claim 60 wherein the interlocking portions comprise an interlocking key and keyway therefor.

62. A retention clip for architectural panels  
15 having upstanding seam flanges adjacent one another and a seam between the adjacent panels, the retention clip comprising:

an upstanding central web having a first cross-sectional thickness and adapted to and positioned at the  
20 seam;

a base flange at a lower end of the central web and for connection to a support for the panels;

a transverse flange mounted on the web and extending transversely to the web to engage the  
25 respective panels to hold the same against uplifting forces trying to separate the panels from one another; and

the transverse flange having cross-sectional thickness greater than the thickness of the central web  
30 to provide strength to resist uplift loads trying to bend the transverse flange.

63. A retention clip in accordance with Claim 62 wherein the transverse flange comprises a separable plate being joined to the central web.

64. A retention clip in accordance with  
5 Claim 63 wherein the plate has a slot therein and the central web projects through the slot.

65. A retention clip in accordance with Claim 64 wherein the transverse flange comprises integral bent portions of the central web being bent to overly the  
10 plate.

66. A retention clip in accordance with Claim 65 wherein the top plate and bent portions are fastened together to form a composite transverse flange.

67. A retention clip in accordance with  
15 Claim 62 wherein the plate has a length greater than the length of the central web.

68. A glazing panel system in accordance with Claim 1 wherein the retention clip comprises:  
a central web;  
20 a bottom flange joined to the central web and having a predetermined length; and  
a top flange joined central web and having a shorter length than the predetermined length of the bottom flange.

69. A glazing panel system in accordance with  
25 Claim 14 wherein the retention clip comprises:  
a central web;



a bottom flange joined to the central web and having a predetermined length; and

a top flange joined central web and having a shorter length than the predetermined length of the  
5 bottom flange.

70. A retention clip in accordance with Claim 38 wherein the top flange has a length shorter than the length of the base.

71. A retention clip in accordance with  
10 Claim 31 wherein the top flange has a length shorter than the length of the base.

72. A retention clip in accordance with Claim 34 wherein the top flange has a length shorter than the length of the base.

15 73. A glazing panel in accordance with Claim 44 wherein the panel is made of extruded polycarbonate plastic.

74. A glazing panel in accordance with Claim 49 wherein the panel is made of extruded  
20 polycarbonate plastic.